

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

- | | |
|-------------------------------------|--|
| n/a | Confirmed |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> The statistical test(s) used AND whether they are one- or two-sided
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A description of all covariates tested |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
<i>Give P values as exact values whenever suitable.</i> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated |

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	For <i>in vitro</i> experiments, the cryo-SEM SUPRA 40VP-31-79 (Carl Zeiss SMT Ltd., Oberkochen, Germany) equipped with an EMITECH K250X cryopreparation unit (Quorum Technologies Ltd., Ashford, Kent, United Kingdom). EDS detector Bruker x-flash 6/100 and Esprit 2.0 Software (Bruker Corporation, Billerica, MA, USA). The 3D printer was controlled by the Repetier-Host software and the 3D models (STL-files) were converted to code (G-Code) by the software Slic3r (http://slic3r.org/). Confocal laser scanning microscope Zeiss LSM 780 (Carl Zeiss Microscopy GmbH, Jena, Germany) with the image exportation by ZEN 3.0 (Carl Zeiss Microscopy GmbH, Jena, Germany). For <i>in vivo</i> experiments, hydrogel volume and inguinal lymph node size were measured using dedicated 7T small animal magnetic resonance imaging (Bruker) and ParaVision 6.0.1. software. For volume determination of hydrogels with incorporated liquid metal particles the nanoScan® PET/CT (Mediso) with corresponding Nucline NanoScan software (3.00.020.0000) was used. Immunohistological stainings were imaged using Axiolmager.A1 microscope and AxioVision software (version 4.8, Carl Zeiss).
Data analysis	For <i>in vitro</i> experiments, Unless otherwise noted, all experiments were performed in triplicate ($n = 3$) and data are presented as mean \pm s.d. Statistical analysis was carried out using the software OriginPro 2017 (OriginLab Corp). For <i>in vivo</i> experiments, quantification of the hydrogel volume and lymphnode size was performed using the software ROVER (v3.0.57h ABX GmbH). Quantification of immunohistological stainings were performed using ImageJ/FIJI (version 1.52i). GraphPad Prism 7 and OriginPro 2017 was used for the generation of graphs and statistical data analysis.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

Invitrogen™, C10340).

Validation

Each antibody was validated for the species (mouse or rabbit) and application IF by the correspondent manufactur.

Eukaryotic cell lines

Policy information about [cell lines](#)

Cell line source(s)

C2C12 cell from ECACC, L929 cells from ECACC.

Authentication

C2C12 and L929 cell lines were authenticated by ECACC. STR-based profiling method was used by ECACC.

Mycoplasma contamination

The cell lines were not tested for mycoplasma contamination.

Commonly misidentified lines
(See [ICLAC](#) register)

No cell lines used in this study were found in the database of commonly misidentified cell lines that is maintained by ICLAC and NCBI Biosample.

Animals and other organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Laboratory animals

female immunocompetent hairless SKH1-Elite mice (age 8-9 weeks, weight 20-25 g) were purchased from Charles River laboratories.

Wild animals

This study does not involve wild animals.

Field-collected samples

This study does not involve field-collected animals.

Ethics oversight

Animal experiments were conducted in accordance with the guidelines of German Regulations for Animal Welfare. The local Ethical Committee for Animal Experiments ("Landesdirektion Sachsen") approved the underlying protocol (reference number DD24.1-5131/450/16) and the animal experiments were conducted at the Helmholtz-Zentrum Dresden-Rossendorf (Institute of Radiopharmaceutical Cancer Research).

Note that full information on the approval of the study protocol must also be provided in the manuscript.